

Claims

1. Process for the production of oils and optionally high quality middle distillates from a hydrocarbon feedstock including at least 20% of end volume above 340°C, process that successively comprises the following stages:

- (a) Hydrotreatment carried out at a temperature of 330-450°C, under a pressure of 5-25 MPa, with a volumetric flow rate of 0.1-6 h⁻¹, in the presence of hydrogen in the hydrogen/hydrocarbon volumetric ratio of 100-2000, and in the presence of an amorphous catalyst that comprises at least one metal of group VIII and at least one metal of group VI B,
- (b) Hydrocracking, without intermediate separation of the effluent that is obtained at the end of the hydrotreatment, whereby the hydrocracking is carried out at a temperature of 340-430°C, under a pressure of 5-25 MPa, with a volumetric flow rate of 0.1-5 h⁻¹, in the presence of hydrogen, and in the presence of a catalyst that contains at least one zeolite and that also contains at least one element of group VIII and at least one element of group VI B,
- (c) atmospheric distillation of the effluent that is obtained at the end of the hydrocracking to separate the gases from the liquid, and to recover at least one liquid fraction that contains compounds with a boiling point of higher than 340°C,

- (d) whereby said fraction is treated directly by catalytic dewaxing at a temperature of 200-500°C, under a total pressure of 1-25 MPa; with an hourly volumetric flow rate of 0.05-50 h⁻¹, with 50-2000 l of hydrogen/l of feedstock, in the presence of a catalyst that also comprises at least one element with a hydro-dehydrogenating function and at least one zeolite that is selected from the group that is formed by zeolites ZSM-48, EU-12, EU-11 and ZBM-30,
- (e) the dewaxed effluent is directly subjected to a hydrofinishing treatment that is carried out at a temperature of 180-400°C, which is lower than the catalytic dewaxing temperature by at least 20°C and at most 200°C, under a total pressure of 1-25 MPa, with an hourly volumetric flow rate of 0.05-100 h⁻¹, in the presence of 50-2000 liters of hydrogen/liter of feedstock, and in the presence of an amorphous catalyst for the hydrogenation of aromatic compounds, comprising at least one metal that is selected from the group of metals of group VIII and metals of group VI B,
- (f) the effluent that is obtained from the hydrofinishing treatment is subjected to a distillation stage that comprises an atmospheric distillation and a vacuum distillation so as to separate at least one oil fraction at a boiling point of higher than 340°C and that has a pour point of lower than -10°C, a content by weight of aromatic compounds of less than 2% and a VI

of greater than 95, a viscosity at 100°C of at least 3cSt (or 3 mm²/s) and so as optionally to separate at least one middle distillate fraction that has a pour point of less than or equal to -20°C, a content of aromatic compounds of at most 2% by weight and a content of polycyclic aromatic compounds of at most 1% by weight.

2. Process according to one of the preceding claims, wherein the hydrofinishing catalyst of stage (e) comprises an amorphous substrate, at least one noble element of group VIII, chlorine and fluorine.

3. Process according to one of the preceding claims, wherein hydrotreatment stages (a) and hydrocracking stages (b) are carried out in the same reactor.

4. Process according to one of the preceding claims, wherein hydrotreatment stages (a) and hydrocracking stages (b) are carried out in different reactors.

5. Process according to one of the preceding claims, wherein during stage (c) of atmospheric distillation, a residue with an initial boiling point of higher than 340°C is obtained that then undergoes the catalytic dewaxing of stage (d).

6. Process according to claim 5, wherein the hydrocracking residue is recycled at least in part in the hydrotreatment stage and/or in the hydrocracking stage.

7. Process according to claim 5, wherein at least a portion of the hydrocracking residue undergoes an additional hydrocracking stage that is different from stage (b), whereby the

effluent that is obtained is recycled to atmospheric distillation stage (c), and the other portion of the residue is treated in dewaxing stage (d).

8. Process according to one of claims 5 to 7, wherein the residue that is obtained from the atmospheric distillation of stage (c) is subjected to an extraction of aromatic compounds (stage c'), and the raffinate that is obtained is catalytically dewaxed in stage (d).

9. Process according to one of the preceding claims for the production of white oils that have aromatic compound contents of less than 0.01% by weight.